VirtualForests

Co-funded by the Erasmus+ Programme of the European Union

University for Sustainable Development Eberswalde

AUTUMN SCHOOL

VIRTUAL FOREST TWINS BASED ON MARTELOSCOPE POINT CLOUD DATA

ERASMUS+ VIRTUALFORESTS PROJECT.

Students will acquire knowledge, skills and abilities related to terrestrial-based remote sensing technologies, 3D stand visualization, virtualization and growth simulation software, and related analytical pipelines.

The intensive learning period comprises field excursions and coursework on the topics of forest stand virtualization for visualization, and growth and management response simulation. Learning objectives include practical training on inventory based on RS technology, digital rendering of forest stands, and coupling with 360° panoramas for mixed augmented or virtual reality representations of a real forest stand.

Date:
Week from 10th to 14th of October 2022

Time:
Every day 09:00 – 16:30 CET

Attendance:
In person (The event will be held in English)

Location:
Eberswalde University for Sustainable Development (HNEE). Alfred-Möller-Str. 1, 16225 Eberswalde - DE.

Speakers:
Prof. Dr. Jan-Peter Mund, Prof. Dr. Jens Müller, Dr. Kevin Beiler, *et al*. (incl. from University of Valladolid, AgroParisTech & Vietnam National University of Science)

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Programme:

Still might be subject to modifications depending on the availability of the instructors and the number of students to attend.

Presential Session 1 (10.10.22) - Introduction and teaching session				
ID	**Activity in brief**	**Duration**	**Activity description**	**Where**
1.1	**Introduction to presential sessions**	9:00-10:15	There will be a short introduction: -Introduce VirtualForest project and the team. - Introduce the students. - Introduction to the course & Additionally: - Quick view to forest campus. Examination procedure, products to achieve and Q&A session.	Computer lab
1.2	**Data provision**	13:30-14:30	A preview of the expected outcomes of the course will be presented to the students. They will be provided with the data package prepared by the teaching team (Orthophoto, 360 Panoramas, 3D Point cloud and forest inventory). These will be the data source for the teachings ahead.	Computer lab
1.3	**Data preparation and pre-processing**	14:30-16:30	Student will set hands on work to clean and tidy the forest inventory data, georeferencing and harmonization with orthophoto. Exploration of 3D point clouds and tools to be in use in the upcoming days.	Computer lab
1.4	**Data entry in DSS & stand rendering/simulation tutorial**	10:30-12:30	The students and assistants will be briefly instructed on DSS's management / rendering.	Computer lab
Presential Session 2 (11.10.22) - Teaching session on Data collection and VFTs				
**can be offered as concurrent training activity for interested partners*				
ID	**Activity in brief**		**Activity description**	**Where**
2.1	**360 Panoramas shooting, Orthophoto Capture, 3D Point cloud collection**	08:30-16:00	The students and assistants will be instructed on the techniques and key points for the proper capture of 360 Panoramic photographs and additional information as source in the creation of VFTs. They will also be briefly instructed on the way to set up an UAV flight with the purpose of imagery capture. In addition, they will be instructed on the techniques and key points for the data collection with a terrestrial laser scanner.	Field work in forests surrounding HNEE campus
Presential Session 3 (12.10.22) - Teaching session on 3D point cloud data processing and visualization				
**can be offered as concurrent training activity for interested partners*				
ID	**Activity in brief**		**Activity description**	**Where**
3.1	**3D Point cloud data processing (Part 1)**	09:00-12:30	Students will be instructed on the different methods, workflows, tools and packages to pre-process and process the 3D point cloud data. Brief presentation on the process.	Computer lab
3.2	**Hands on work (Part 1)**		Students will set hands on work to process the provided point clouds. Tutorial with assignments will be created.	Computer lab
3.3	**3D Point cloud data processing (Part 2)**	13:30-16:30	Students will be instructed on the different methods, workflows, algorithms and packages to process, visualize and render the 3D point cloud data. Introduction to the obtention of Tree parameters such as bhd & height from a point cloud.	Computer lab
3.4	**Hands on work (Part 2)**		Students will set hands on work to visualize and render the provided point clouds. Tutorial with assignments will be created	Computer lab

Presential Session 4 (13.10.22) - Teaching session on VFTs / ArcGIS Story Maps				
*can be offered as concurrent training activity for interested partners				
ID	**Activity in brief**		**Activity description**	**Where**
4.1	**VFTs creation (theory & tutorial)**	09:00-11:00	Students will be instructed on the VR-easy platform, its management requirements, and methodology to create a Virtual Forest Tour from scratch.	Computer lab
4.2	**Story map creation**	11:00-16:30	The students and assistants will be instructed on how to create a comprehensible and useful story map based on the data prepared and processed during the week. Short presentation of the virtual forests story map already created. / Potentiality in virtual reality platforms / how to grow a tree (simulation).	Computer lab
4.3	**Hands on work**		Students will set hands on work and create their own Story map / VR / Simulation. Tutorials with assignments will be created	Computer lab
Presential Session 5 (14.10.22) - Students' presentation & closing ceremony				
also serving as multiplier event for partners and local stakeholders				
ID	**Activity in brief**		**Activity description**	**Where**
5.1	**Project seminar/Missing or reinforcing points**	09:00-10:30	Students projects will be discussed and framed. They will have the opportunity to share their ideas, show their progress if applicable. This space could also be used for reinforcing knowledge and brainstorming.	Classroom or meeting room depending on capacity.
5.2	**Other project's experiences & potentialities to the future**	11:00-12:00	Talk on the potentialities, strengths, weaknesses, and obstacles on the virtualization of forests. Other projects experiences.	
5.3	**Feedback session**	12:00-13:00	Feedback on the results, and discussion of the development of the Autumn school.	
5.4	**Farewell ceremony**	13:00-16:30	Student's participation certificates given. Closing ceremony on a social event including some drinks and snacks to celebrate the completion of the training	

Tags:
HNEE, VirtualForests, virtual forest twins, 3D point cloud, forest virtualization, forest IT, marteloscope.
